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A user facility for experiments on pulsed fusion systems

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There are fusion systems whose dimensions can be scaled down to a few centimeters, if the plasma density and confining magnetic field are raised to sufficiently high values. These systems include the FRC, spheromak, Z-pinch, multiple mirrors, etc. The fusion-grade plasma in these systems can be obtained with the energy deposited to the plasma as low as 10-100 kJ. This prompts a "user-facility" approach to the studies of this class of fusion systems. The user facility would consist of a pulsed energy source (presumably, a Marx generator), and a set of diagnostics permanently deployed at the facility site. Research groups could bring their own "targets" (experimental assemblies of a few centimeter size) to perform a series of experiments at the facility. Because of their small size, the targets will be relatively inexpensive and thus well within the reach of the university groups. The paper describes several specific experiments on creation and subsequent adiabatic compression of centimeter-size closed field line configurations.

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